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| DOE Site: | All Sites |
| EM Project: | Environmental Modeling |
| ETR Report Date: | September 2011 |

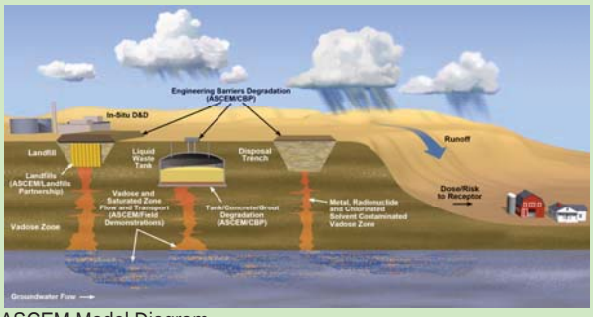


# External Technical Review Summary

**United States Department of Energy Office of Environmental Management (DOE-EM)**

## Peer Review of Advanced Simulation Capability for Environmental Management (ASCEM)

### Why DOE-EM Did This Review




ASCEM Model Diagram

EM is faced with one of the largest and complex groundwater and soil contamination problems in the world. A major goal of EM is to move from active to passive remediation followed by long-term monitoring at DOE sites. To aid in achieving this goal, the Advanced Simulation Capability for Environmental Management (ASCEM) was initiated to develop a state-of-the-art scientific tool and approach for understanding and predicting contaminant fate and transport in natural and engineered systems. The ASCEM modeling tool will incorporate capabilities for predicting releases from various waste forms, identifying exposure pathways and performing dose calculations, and conducting systematic uncertainty quantification.

The review team was tasked with reviewing the document: *ASCEM FY10—FY15 Integrated Modeling Implementation Plan* along with supplemental information provided by program managers and staff. The primary objective was to evaluate the planning and strategic development of the ASCEM effort. At the time of the review there was insufficient information to conduct a detailed technical review, although this review will be scheduled for Q4 FY11.

### What the ETR Team Recommended

The review recommended that continued periodic independent review and assessment of ASCEM be conducted to: (1) ensure application of appropriate metrics to demonstrate capability and value to EM's current and future needs, (2) determine whether the appropriate interfaces and services are being developed, and (3) enable funding sustainability. Other recommendations included:

- The critical needs of documentation of the application programming interface (API) set, along with sufficient examples and applications, should not be underestimated in their importance in meeting successful integration goals stated for the DOE's EM complex.
- In order to gain regulatory acceptance of ASCEM-derived performance assessments, it must successfully integrate disparate data and models with advances in model evaluation science (i.e., UA/SA/PE), and peta-scale high performance computing (HPC). Success is contingent upon achievement of high levels of quality-assurance throughout this integration effort (i.e., through verification, validation, documentation, independent peer review, etc).

### What the ETR Team Found

The review team believes the design of ASCEM is well conceived, reasonable and consistent with scientific principles. The team also stated that an integrated, flexible and modular modeling framework has the potential to enhance knowledge integration, site characterization, and understanding of contaminant fate and transport processes, which can lead to dramatic improvements in management of DOE-EM sites, reduction of risk, and cost savings.



*The purpose of an External Technical Review (ETR) is to reduce technical risk and uncertainty. ETRs provide pertinent information for DOE-EM to assess technical risk associated with projects and develop strategies for reducing the technical risk and to provide technical information needed to support critical project decisions. Technical risk reduction increases the probability of successful implementation of technical scope. In general, ETRs assesses technical bases, technology development, and technical risk identification and handling strategies.*